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SCIENTIFIC LETTER

Transplantation of fecal microbiota in multidrug-resistant *Klebsiella pneumoniae* colonization and infection☆

Trasplante de microbiota fecal en la colonización e infección por *Klebsiella pneumoniae* multirresistente

Dysbiosis of the gut microbiota is common in patients who receive broad-spectrum antibiotics. Multidrug-resistant organisms are a growing threat, especially in critically ill and immunosuppressed patients. Faecal microbiota transplantation (FMT) for colitis caused by *Clostridioides difficile* has been reported in multiple studies and is an effective treatment in cases of recurrent infection.[1] FMT treats the infection per se, within the organ in which the infection is occurring. That is to say, it attempts to restore the balance (eubiosis); as a result, *C. difficile* will cease to cause problems in the organ itself. Although FMT has been used to treat recurrent *C. difficile* infection, it has other indications, such as for the eradication of multidrug-resistant organisms colonising the gastrointestinal tract. Studies in recent years have proposed using FMT for other multidrug-resistant organisms such as *Klebsiella pneumoniae*. It should be noted that, with regard to *K. pneumoniae*, what FMT has been achieving in recent years is to eliminate colonisation in some patients.[2]

For this study, a literature review was conducted to summarise the information available on *Klebsiella* using the PubMed, CINAHL and Scopus databases. The keywords used were ''faecal microbiota transplantation'' and ¨*Klebsiella pneumoniae*¨combined using the Boolean operator ÄND¨. Articles published in the past five years were selected.

In a case report made by Ueckermann et al.[2] and published in 2020 in South Africa, a patient with persistent infection caused by multidrug-resistant *K. pneumoniae* was successfully treated with FMT using faeces from a healthy donor. The patient was a 60-year-old man admitted with septic shock caused by his pacemaker cable. Following FMT, he had no further episodes of sepsis, and his blood cultures were repeatedly negative for all bacteria. Six weeks after the transplantation procedure, the patient's faeces were tested and the Shannon diversity index was found to have improved to 2, which is considered within normal limits.

A case report by Biliński et al.[3], published in 2016 in Poland, reported the successful use of FMT to inhibit intestinal colonisation by *K. pneumoniae* and *Escherichia coli* (both multidrug-resistant) in a 51-year-old host. The FMT was obtained from the faeces of a healthy donor. The day before the procedure, prophylactic antibiotics were suspended and bowel cleansing was done with an oral laxative. The patient fasted for 12 h, after which treatment was started with a proton pump inhibitor twice daily to neutralise the stomach acid. The next day, 100 g of faeces were mixed with 100 mL of saline solution and infused in the small intestine through a nasoduodenal tube. Bacterial cultures taken 10 and 26 days after the transplantation procedure showed no growth of either *K. pneumoniae* or *E. coli*. In the months that followed, the patient had no episodes of infection.

A case reported by Ponte et al.[4], published in 2017 in Portugal, presented a 66-year-old woman with intestinal colonisation by multidrug-resistant *K. pneumoniae*. A decision was made to perform FMT as the patient had recurrent infection with *C. difficile* as well as intestinal colonisation by *K. pneumoniae*. This patient was treated by means of FMT, with infusion of 50 mL of liquid faeces in suspension in the duodenal lumen. The faeces came from a donor. The treatment was effective. At subsequent appointments, the patient remained asymptomatic and her cultures were negative (she did not present colonisation by micro-organisms again).

A study by Biliński et al.[5], conducted in 2017 in Denmark, analysed the efficacy of FMT in 20 participants with blood disorders colonised by antibiotic-resistant bacteria. A total of 25 transplantation procedures were performed in 20 participants. Full decolonisation was achieved in a month in 15/25 (60%) of the transplants. There were no serious adverse events. Partial decolonisation was seen in 20/25 (80%) of the transplants. Analysis of the microbiota revealed a greater abundance of *Barnesiella*, *Bacteroides* and *Butyricimonas* and a higher bacterial content in faeces, resulting in eradication of *K. pneumoniae*. Faecal transplantation in patients with blood disorders is safe and promotes eradication of gastrointestinal tract colonisation.

Examination of the results of contributions made by authors of various origins in recent years reveals FMT's potential in colonisation by multidrug-resistant *K. pneumoniae*. FMT should be considered in the treatment of this type of patient.

Hence, although the evidence reviewed appears to indicate that positive results can be expected from this treatment in multidrug-resistant *K. pneumoniae*, the lim-

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ited body of research in this field is currently insufficient for making general recommendations. Hence, there is a need for more studies in this field. As a result, the efficacy and possible short- and long-term complications can be examined and its possible synergistic effect with other therapies can be explored. This would in turn allow healthcare professionals to offer their patients the best care based on the latest scientific evidence.

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Microscopic lymphocytic colitis due to duloxetine: Case report and review of the literature☆

Colitis microscópica linfocítica asociada a duloxetina: descripción de un caso y revisión de la literatura

In many cases, the differential diagnosis of subacute and chronic diarrhoea represents a challenge. It represents an even greater challenge in patients with underlying psychiatric disease, in whom it can be difficult to distinguish disorders caused by this morbidity from other unrelated signs and symptoms.

We present the case of a 26-year-old patient, a smoker with a history of borderline personality disorder and long-term bulimia nervosa, who had required admission to a psychiatry department for a month, during which time her medication had been adjusted. She visited the emergency department because, after adhering to a highly restrictive diet for two weeks, she presented signs and symptoms consistent with epigastric pain and an increased frequency of bowel movements (up to 10 per day), with watery stools without blood or mucus.

Blood testing revealed compensated metabolic acidosis and mild hypokalaemia, as well as a slight increase in acute-phase reactants. A decision was made to admit the patient to the internal medicine department for testing.

During her stay on the ward, a full microbiology test was done, including for *C. difficile*, which was negative. With these results, the patient was started on treatment with loperamide, and the frequency of her bowel movements decreased by half. In addition, full immunology and endocrinology tests were ordered, along with clinical chemistry testing of faeces. These showed no indicators of malabsorption, occult blood in faeces, presence of immediate substances or markers of exocrine pancreatic failure.

As the patient's symptoms persisted, an upper gastrointestinal endoscopy was performed. This showed antral gastritis and suspected duodenal atrophy. The biopsies taken revealed no abnormalities. Moreover, a colonoscopy was performed and showed no macroscopic abnormalities. However, mucosal biopsies taken identified a pattern consistent with lymphocytic colitis (Fig. 1).

The patient's medical record was reviewed and it was confirmed that, during her prior admission, she had been started on duloxetine. Given the reported link between this drug and lymphocytic colitis, a decision was made to suspend this treatment.

The final diagnosis was lymphocytic colitis in relation to duloxetine, a serotonin and norepinephrine reuptake inhibitor that had been recently added to her treatment as an antidepressant. The patient's condition improved after she was taken off duloxetine.

Lymphocytic colitis is a subtype of microscopic colitis that clinically manifests as chronic watery diarrhoea without blood or mucus.[1] Its diagnosis requires a strong suspicion, as

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